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## *Life-Histories of Sawflies.* Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from Zool. S. S. 1616).

### CIMBEX CONNATA, *Schr.*

Imago. *F. de P. Schrank, Enum. Insectorum Austriæ*, p. 322, No. 648. *Panzer, Deutschl. Ins.* 84, 12 (Tenthr. montana). *Lepel. de St. Fargeau, Monogr. Tenthr.* No. 75. *Klug, Versuch —Gattung Cimbex*, p. 83. *Hartig, Blatt-und Holzwespen*, p. 65. *Zaddach und Brischke, Beobacht*, p. 254.

Larva. *Rösel von Rosenhof, Insectenbelustingungen* II., *Bombyl. eu Vespar*, tab. xiii. p. 57. *De Geer, Mémoires* (Goeze's transl.) ii. 2, 230 (larva only). *Lyonet, Recherches*, p. 175—179, pl. 16. *Ratzeburg, Forstinsecten*, iii. p. 135.

Cimbex niger, abdominis apice, tibiis tarsisque fuscescentibus, alis cæruleo nitore relucentibus (mare) aut fusco-aeneus, nitens, abdominis flavi macula magna basali violacea, alis lutescentibus.

The history of the determination of the insect whose metamorphosis I propose to describe in the following pages, illustrates the difficulty that is placed in the way of subsequent writers when an author of repute has once lent the weight of his name to an erroneous hypothesis, for although in the larval state it had been separated from the nearly allied species by Albin, Rösel and De Geer, it had always been confounded with those species in the perfect state, in consequence of the exceedingly small difference between the imagos. Professor Klug, of Berlin, when distinguishing between the various species in his 'Versuch einer Darstellung der Familien und Arten der Blattwespen Gattung Cimbex, *Fabr.*,' might have recognised Cimbex femorata as a distinct species, by giving due weight to the distinguishing characteristics of the larva; instead of which he has confused it with C. femorata, *L.*, lutea, *L.*, and sylvarum, *Fabr.*, and has named this imaginary species Cimbex variabilis. In proof of the correctness of this view he points to the discordant statements of those authors who had described the metamorphoses of connata or femorata. We are quite willing to allow that these statements are very confused, and that many authors are either obscure or incorrect in their descriptions;

but this is no excuse for passing over as of small value the very precise statement respecting the different food of the larva, the latter being moreover recognisable by the number of blue spots on the sides of the body. It should have struck Klug that, in every description of the large Cimbex larva which fed on the alder, mention was always made of the round blue spots on its side, while, on the other hand, whenever the large sawfly larva feeding on the willow was spoken of, the said blue spots were always absent from the description.

Ratzeburg was the first writer who concluded that the species, the larva of which always had blue markings on the side, and at the same time always fed exclusively on the alder, ought to be separated from the other large Tenthredos—Cimbex variabilis (still used in its collective meaning), axillaris, &c.: he described it in his 'Forstinsecten' under the name of Cimbex Humboldtii, and in this, which we consider a correct view of the case, he has been followed by Messrs. Zaddach and Brischke in the work quoted at the head of this paper.

The reader may now justly remark, if Ratzeburg was the first whose acuteness distinguished the species in question from its allies, why is the name Cimbex Humboldtii, given to it by this author, passed over in favour of that bestowed on it by Schrank? is it quite certain that the insect named by Schrank Tenthredo connata was our species? I admit that I have not had an opportunity of seeing his 'Beiträge zur naturgeschichte,' (Leipzig, 1776), in which the name of connata first appears, also that his diagnosis in the Enum. Ins. Austriæ, p. 322—'Tenthredo, antennis clavatis, nigra; abdomine fasciis flavis' is not quite satisfactory; but, in the first place, the addition—"Habitat in alno" supplies a more truly distinguishing characteristic, and, secondly, I am content to follow the lead of Professor Zaddach, whose clear and acute judgment is accompanied by a most comprehensive acquaintance with literature.

I should be most happy if I might one day be fortunate enough to make known the life-histories of the other species which were included by Klug and Hartig in their C. variabilis. However, when I reflect that I have endeavoured to rear this species from the larva during more than twenty years, and that it was only in 1862 that I first succeeded in getting an imago from the cocoon,—and calling to mind how scarce the larvæ of most of the Cimbices are,—how solitary they live and how long a time the larva remains unchanged in the cocoon (and this is the chief hindrance in rearing them), I fear I should have to look forward to double the usual term of life in order to be able to elucidate this question.

Zaddach has most carefully noted the literature of the species of Cimbex, and instituted a comparison between the various authors. He arrives at a theory regarding the so-called variabilis which, read by the light of what he and his friend Brischke have been able to make out from their attempts at rearing this species, gives the following result. The Cimbex variabilis of Klug, in all probability, embraces four species, the imagos of which bear a strong resemblance to each other—1, the subject of the present description, Cimbex connata, *Schrank*, called by Ratzeburg C. Humboldtii, and whose very distinct larva is always found on the alder; 2, Cimbex Betulæ, *Zadd.*, the female of which is known as C. sylvarum, *F.*, and whose larvæ (at all events in Germany) live exclusively on the birch; 3, Cimbex Fagi., *Zadd.*, a hitherto doubtful species,—according to Drewsen and Dahlbom the larva feeds on the beech, and is distinguished by the dark brown tint of the skin; lastly, 4, Cimbex Saliceti, *Zadd.*, the pale coloured larvæ of which are found feeding upon two species of willow. These larvæ are described and figured by Bonnet, Lyonet and De Geer: I have also in my possession an unpublished description, (with a beautiful drawing), by C. B. Voet, treating of the last-named species.

Whether these species are constant can be ascertained only by experiments conducted with great care, and requiring much time to be devoted to them. It seems to me that our country is not particularly well adapted for the investigation, as being poor in individuals of the genus Cimbex, and that we may rather look for light from the East—for example, Pommorania.

We will now return to the special consideration of our subject.

I think I may hazard the opinion that the female lays her egg in the petiole of the leaf of the alder, added to which I should be disposed to consider it highly probable that she deposits but few eggs, and that these are placed at considerable distances apart. De Geer states that on opening the abdomen of a female he found it to contain rather large eggs of an oval shape and pale green tint; it is not certain, however, that he actually examined a female of Cimbex connata.

Although the imagos appear in May, I have not succeeded in finding a larva before the month of September. The youngest larva which I have observed was found on the 1st of September, 1861;

it appeared to have already undergone two changes of skin, and had thus probably come out of the egg at the end of July or the beginning of August. I have, however, found nearly full grown larvæ in the first week of September, so that it seems the eggs are laid sometimes in the spring and at others in the beginning of the summer.

Fig. 1, plate 1, represents the young larva above-mentioned, of the natural size; fig. 2 is the same larva magnified. I have no record of its exact length: it had twenty-two legs, the abdominal legs being wanting on the eleventh segment. The head and the thoracic legs were a pale bluish green, the other parts of the body being yellowish green; along the middle of the back there was a row of eleven or twelve round black spots, and next that a narrow yellow stripe: between this latter and the row of black spiracles there was a small round black spot on each segment. I found two more such young larvæ during that year; they were no more lively or active than those more advanced; they were generally curled up like lap-dogs: I was surprised to find that they fed about the middle of the day, as other larvæ which do not feed the whole day usually do so either in the morning or the evening.

According to Zaddach and Brischke (p. 241 of the work mentioned) the larva is pale green previous to the first moult and without yellow lines, but having the three rows of black dots as described above.

After my young larvæ (which I had in the house) had moulted for the first time, which will have been the third time during their existence, they had assumed the colouring which most writers on the subject describe: for example (see fig. 3), the head was pale greenish yellow, the body at the sides was yellow inclining to green, and becoming gradually greener, with two narrow yellow stripes on the back; between them was a somewhat broader line transversely striped with pale and dark blue, and extending to the penultimate segment of the body. Between the row of spiracles, which are blackish, and the yellow lines are twelve round bluish gray spots. The ventral surface, together with the abdominal legs, were pale yellowish green. The eyes were inserted in round black spots.

A full grown larva, represented at fig. 4, which I found nearly in that state on the 7th of September, 1857, crawling on the ground, was slightly different in colouring: it was more of a gray than a yellowish green, and the head had a blue tint. In both these examples each segment of the body, with the exception of the last, was divided into folds by five or six wrinkles. As far as the gray-blue spots on the middle of the blue dorsal stripe the skin was smooth, then came three white warts one below the other on the fold of the skin below the spot: from the lowest of these proceeded a double row below the spiracle extending upward to the other side of it. Below the stigma was a projecting muscle or fat mass under the skin, which at that spot was covered with sharp, more or less prickly warts. I have represented one of these six-pointed little warts at fig. 6, as it appears when the larva is examined along the side with a very strong lens and in the position of fig. 4.

Figure 7 represents one of the anterior legs of the larva magnified: when this object was examined with a lens the skin appeared to be double at the joints, having single hairs on the middle of the segments; below the base of the claw, which was curved and very sharp, was a round knob.

The spiracles were somewhat of the shape of the impression of a stag's hoof, that is to say, they were surrounded by a thickening of the skin of a dark colour, which had some resemblance to the impression of a stag's hoof in the wet sand.

I never observed these larvæ to eject any fluid as is done by other Cimbex larvæ, especially by those of Cimbex Amerinæ. I was also unable to detect any ducts or openings above the spiracles. Zaddach observes—"Die Larven spritzen wie die übrigen Cimbex larven." On the other hand Rösel says, "Ich mogte sie gleich noch so offter berühren, so bleibe sie doch allezeit trocken." Lyonet does not mention any ejection of fluid. I took advantage of the skin of the head, thrown off in moulting, to sketch some of the parts of the mouth—these are represented on plate 1, in the middle. Fig 9 is the semicircular labrum emarginate at the centre; fig. 10 represents the mandible, on which I observed three small teeth; and at fig. 11 is a drawing of the maxilla, rather strongly dentate, with rounded lateral pieces and a thick palpus tapering to a point. A large proportion of the larvæ which I had collected at intervals during the autumn refused to spin up, turned brown and hard, and died; I was quite unable to discover the cause. Others spun up in a hard cocoon of a brown colour, of which one is represented at fig. 12, plate 2: this cocoon was rough on the outside and covered with little pieces of wood, more or less of a metallic tint, single, and very smooth on the inside. The larvæ remain from seventeen to eighteen months in the cocoon without change of form; this circumstance has been mentioned by former writers on the subject, especially by Lyonet, who lays much stress upon this matter. The development of these creatures is thus excessively slow in comparison with what has been observed with some species of Nematus, the imagos of which leave the cocoon ten or eleven days after the larva has spun up: it is, therefore, not to be wondered at that the attempt to rear the large Cimbices so seldom succeeds, as too much damp and too great heat are both equally fatal to the life of the larva. After having been disappointed for years, I was at last fortunate enough to rear a female imago from the cocoon: I had a larva which had spun up on the 10th of October, 1861: on the 11th of April, 1863, I very carefully opened the cocoon in the hope of finding a pupa contained in it. In this expectation I was not disappointed, as had so often been the case with other larvæ—I had the pleasure of finding a pupa, which I took to be three or four days old: it lay in a somewhat curved position, and was of a greenish yellow colour, the head and thorax of a somewhat brownish yellow, and the eyes pale brown (see fig. 13). Having made a drawing of the pupa I replaced it in the cocoon, which I closed as carefully as possible. On the 2nd of May following a female imago was developed, represented at fig. 14. Another female appeared from a cocoon, which I had not opened.

Both these examples must be classed under that variety (according to Klug) of Cimbex variabilis which is figured by Panzer as C. montana: they were twenty millimetres long, expanding to forty-three millimetres; the head was of a bronzy brown, with purple tints behind the eyes, and covered with recumbent, silky gray hairs; eyes and mandibles deep brown, palpi pale yellow, antennæ (fig. 15) with the first two joints short and broad, of a brown colour and hairy, the remaining joints pale orange and glabrous; the third joint elongate, the fourth the length of the two basal joints; the fifth again shorter, and then a rather thick knob, clearly composed of four joints anchylosed—thus making nine, the normal number for the antennæ of saw-flies. The thorax is entirely bronze coloured, the under side inclining to purple, and covered with fine shining gray hairs. The coxæ and the larger half of the femora from the base are of the same colour; their lower half and the tibiæ are paler; the tarsi are brownish yellow. The spines at the end of the tibiæ and the patellulæ on the tarsal joints are transparent at the points; the wings are translucent, of a brownish tinge, and clouded at the extremity; the nervures are reddish brown; the stigma, which is very elongated, is deep brown. In the upper discoidal, the first submarginal and the anal cells are brown spots; the anterior part of the anal cell is divided by a straight nervure. The first segment of the abdomen is bronze coloured, and has a deep semicircular emargination on the dorsum, the space being occupied by a white membrane. The second segment is deep purple; the third yellow, with a broad purple spot, occupying the centre of the dorsum; the fourth yellow, with a longitudinal purple mark in the middle; the remainder yellow. The divisions between the segments are mostly deep purple. The ventral surface is dark, either brown or purple. The valves of the ovipositor are deep brown, and covered with stiff hairs. Although I have so often kept the cocoons of this species, and that for long periods, I have never been fortunate enough to rear a male insect; but Professor Zaddach's expressions respecting that sex are so precise, that I have felt no hesitation in representing a male at fig. 16, from a specimen taken by M. Fransen, near Rotterdam, and preserved in the Museum at Leyden. This writer, after enumerating the characteristics which distinguish the male of C. connata according to the diagnosis of Ratzeburg, continues—"Weit mehr in die Augen fallend als dieses Merkmal, auf welches Herr Ratzeburg aufmerksam gemacht hat, ist ein anderes, welches in den Flügeln liegt. Diese sind nämlich durchsichtig und tragen bald schärfer, bald weniger scharf die gewöhnliche Zeichnung, aber die ganze Flache des Flügels zeigt von der Seite gesehen einen sehr schönen, und lebhaft hellblauen Atlasglanz." With this characteristic as a guide, I have for years past been able easily to separate the males of the different species of sawflies found in this museum under the collective name of C. variabilis, the difference being immediately perceptible. The male which I have represented was twenty-two millimetres long, with a flight of forty-five millimetres. Head, thorax, coxæ and femora black, with a purplish glow; the abdomen is purplish black, a reddish tinge being perceptible on the terminal segments; the basal half of the antennæ is brown, the remainder being orange; the tibiæ are deep brown, the tarsi ferruginous. The whole body is covered with black and brown hairs. The wings are transparent, the nervures being ferruginous, and the stigma dark brown; as mentioned above they have a cærulean reflection in proportion as the light falls upon them.

The ovipositor and saw of the female, represented at fig. 17, have been accurately described by Lyonet: according to his figure the saw differs in some measure from that of Cimbex Saliceti, lutea, or whatever the species may be called, which lives on willows. At fig. 18

I have given a drawing of a part of the margin of the saw, copied from Lyonet.

In conclusion, I should feel obliged to any of my readers who would send me any Cimbex larvæ which they may meet with feeding on willow or beech and birch, so that I may be able to observe their metamorphoses with a view to their publication in this journal.

## *Ornithological Notes from North Lincolnshire.*

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1670).

### APRIL.

*Goldcrested Wren.*—I have seen so many of these little fellows during the last week, about the hedgerows and plantations, as to lead to the conclusion that many are now returning to their northern summer quarters.

*Jack Snipe.*—April 5th. Last observed: two pairs seen.

*Golden Plover.*—April 6th. Last observed: ten seen, all wearing their black waistcoats.

*Bartailed Godwit* —April 6th. Two seen on the foreshore.

*Scaup Duck* (Fuligula marila).—April 10th. Last seen on the Humber.

*Fieldfare.*—April 10th. Last observed, and in considerable flocks.

*Tree Sparrow* (Passer montanus).—April 19th. Several pairs seen about the marsh hedgerows and pollard hawthorns—evidently intend nesting.

*Hooded Crow.*—April 20th. I find the hoodie is jotted down in my note-book every day for the last ten, thinking each day would probably be the last: this, however, was "positively their last appearance."

*Wild Duck* (Anas boschas).—April 23rd. This morning riding across a field of wheat in the marshes I put up a wild duck: where she rose was a single fresh-laid egg; the egg was on the bare ground, no nesting materials having been collected. On the 2nd of May the eggs numbered ten (the total number laid). A circular nest had been formed round them of dead grass and weeds, and they were embedded in down from the duck's breast: during his wife's absence the drake occasionally associates with some tame ducks in the neighbouring drains, and one day had a fight with their drake, getting, however, well thrashed. Five pairs of mallard are this season breeding in our marsh district. When the ducks are sitting the drakes flock together and resort to the nearest water,—in this case the Humber. I am informed that some few years since eleven drakes, probably representing as many sitting ducks, came daily into the Ashby decoy. During a visit lately made to this decoy, I was told that varieties of the common wild duck are occasionally seen and taken: one duck with a white throat has spent eight winters there; and there is also a spotted duck that has come in regularly for four or five years. The supposed ruddy sheldrake (Zool. 9046) is, I find, merely a *pale variety* of the female of A. boschas, and very similar to one captured on the Humber about the same time, and described by me in the 'Zoologist' (Zool. 9047). It is not surprising that varieties of the wild duck are thus occasionally met with, since the wild birds associate with the tame on our drains. Every year in the autumn hundreds of ducks are brought over from Holland to Grimsby in the steamboats, many eventually finding their way to the Lincolnshire farm-yards. It is impossible to distinguish some of these foreigners from the wild A. boschas; and there are endless varieties, more or less resembling the wild breed. These foreign birds fly nearly as well as their wilder brethren, and will not unfrequently go off altogether: I have heard of their being shot on the Humber; no wonder that occasional varieties are captured in our Lincolnshire decoy.

I recently observed a large dark-coloured round-winged hawk hovering directly over my wild duck's nest: either duck or eggs must inevitably have "come to grief" had it not been for the pertinacious attack of the peewits. This hawk flew like an owl; I think it was a buzzard, but its red-coloured back was unlike that species.

*Guillemot, &c.*—April 27th. When off Flamborough Head this morning in a friend's yacht, returning from a cruise in the North Sea, we observed large numbers of guillemot, razorbills, and a few kittiwake gulls, but no puffin,—this species, as far as m yobservation goes, not arriving on this coast before quite the end of April. Some scoters and a redthroated diver were also seen. The guillemots were mostly in the summer plumage—some were in the dress of winter, and others again in transition. The cry of this species heard at night is peculiar, and has quite a human sound, like a good-humoured chaffing laugh—Hah, hah, hah—hah-a-a.

*Stone Curlew.*—April 28th. When driving across the Crosby Common, near Ashby, about eleven o'clock on the night of the 28th, I heard the stone curlews calling. This species is yet, I am glad to say, comparatively common in this locality; and, I am told, twenty to thirty may be seen in the course of a day's walk. Some years since they were, however, much more abundant.

The great sand commons of Crosby and Frodingham, with their adjoining warrens, were, till very recently, the haunt of many birds now extinct, or becoming very rare in England. This wild land in some respects resembles the "breck" district of Norfolk, differing, however, in its many pools and swamps, fringed with low brushwood, and to a considerable extent overgrown with rank aquatic vegetation, once the stronghold of the bittern, which is yet occasionally seen in the district, but at long intervals, and I am afraid is fast verging on extinction. The ruffs and reeves, once numerous, are now probably extinct: the spotted crake is not uncommon. In the autumn the low marshy portions are the favourite retreat of the shorteared owl, and, I am informed, the almost incredible number of thirty have been seen on the wing together. In the woods of spruce and oak (one alone is four thousand acres in extent), which extend for miles to the south and west of this wild country, woodcocks breed; and some of the best woodcock shooting in the country is to be found here. Some years since, on a neighbouring estate, eighty-five were killed in one day; sixty on the following. Woodcocks are very partial to oak woods, and their presence may be known by examining the dead leaves under the oaks, as these birds, in their search for grubs and insects, turn over the dead leaves, laying them with great regularity in the same position, but the other side upwards. Stock doves are not uncommon, breeding in the warrens in deserted rabbit-burrows. By some they are called sand doves, and the natives have an idea they are distinct from the stock dove of the woods, which nests in holes of trees, or on the tops of pollards; they admit, however, that the only difference is in the size, the sand dove being the smaller of the two. The lively and chastely-coloured wheatear is very abundant, flitting from stone to stone, or perched on the common walls: these walls are built of the dark lias clay, and have a very curious appearance, as they are studded thickly with that characteristic lias fossil, Gryphæa incurva, *Sow.*

*Shoveller.*—This duck is not uncommon in the Trent district, and two hundred and eighty-five are recorded as having been captured on the Ashby decoy in thirty-five years. It must by no means be supposed that every rare duck which shows itself on a decoy is captured: during the last winter a flock of sixteen shovellers, principally males, came into the decoy; I believe none of these were taken. These ducks have an odd habit of swimming round and round each other in circles—they will do this for hours together. Nearly four thousand ducks—mallard, widgeon and teal—were taken during the season 1848-9. The year is remarkable for the number of widgeon captured.

*Garganey Teal.*—About twenty garganeys are recorded as having been taken at Ashby in twenty years. A pair of these little ducks were seen in April this year in a pool on the neighbouring common: they were not shot.

*Rare Birds killed in the Trent District, North Lincolnshire.*—At the sale of the late Captain Healey's effects, at the Ashby-decoy Cottage, were several cases of stuffed birds,—Lincolnshire specimens,—either shot in the neighbourhood or taken on the decoy. Others which I saw now form part of a private collection in the neighbourhood. Amongst the most noticeable were merlin (male and female, the male an old bird in the beautiful mature plumage), common and roughlegged buzzards, fern owls, crossbills (immature), thick-knee plover, bitterns, ruffs and reeves (the former in their beautiful nuptial attire), garganeys, shovellers, pintails and gadwalls, hooper and Bewick's swan, little auk (captured on decoy), pheasant (old English type, Phasianus colchicus), blackcock and redlegged partridges. Black game were introduced into the district; not so, however, the redlegged partridge, which fortunately is a very rare bird.

*Hoopoe.*—"A hoopoe (Upupa epops) has just been shot in Holbeach Fen, and has been forwarded to Mr. Foster, the curator of the Wisbeach Museum, for preservation." —'Stamford Mercury,' April 30th).

## MAY.

*Whimbrel.*—May 1st. First arrival; several flocks observed.

*Common Dotterel.*—May 4th. I have had a long walk to-day across the Humber marshes after dotterel, thinking both of a friend's collection and the parasites, which as yet I had had no opportunity of examining. These marshes are one unbroken stretch of pasture land, now as green as an emerald; any "trip" of dotterel could not fail to be seen with such a background. Whimbrel I found in plenty, but wary and difficult to get near. Swifts were in some numbers, and hawking close to the ground. Peewits everywhere; and a couple or two of wild ducks, evidently residents in the district. Whinchats, wheatears, pipits, yellow wagtails and sky larks on every bank and in every field. On the Humber, but some distance from the bank, was a small flock of scoters, males and females: as I watched them a beautiful mature lesser black-backed gull came sweeping along the foot of the embankment, sailing just below me; then turned and came back over the same ground: surely, I thought, you must know of the "Bird Bill," so let him pass in safety. Late in the afternoon, when returning home, having given up all chance of seeing any dotterel, I came most unexpectedly on to a small trip of six, and as they rose dropped two. Poor little fellows! Now I had them in my hand, I wished them alive again; and although I had been out that day for that purpose alone, walked homewards with something of a heavy heart. This shooting is the worst part of an ornithologist's work, and at such times even the "sacred cause" itself seems hateful. Often, after watching with my glass some little group of birds, noting down all their pretty ways and habits, and looking as it were into their dark truthful eyes, I have felt the greatest reluctance in taking up my gun. It is all very well when birds spring up suddenly and unexpectedly, but this shooting in cold blood, sneaking up under cover of bank or hedge, is not pleasant work. In all our ornithological rambles it is well to bear in mind that beautiful sentiment of the poet—

"He prayeth well who loveth well
 All things, both great and small;
For the dear God that loveth us,
 He made and loveth all;"

and to make it a rule never to destroy more than is absolutely necessary for the pursuit of knowledge.

*Spotted Flycatcher.*—May 10th. First appearance.

*House Martin.*—May 11th. First seen: a single bird, and the only one observed up to the present day, the 19th of May.

*Gray Plover.*—May 11th. Common as this species is on our "flats" in May, owing to their extreme wildness I have never yet had the good fortune to obtain specimens in the full summer dress; nor, as far as I am aware, have our numerous gunners been more successful. On a stretch of coast, less than half a mile in extent, I have this day seen upwards of a hundred in flocks of from ten to twenty; and, what is rather remarkable, nearly all are mature birds in full summer plumage, the transition dress being quite the exception. Every little flock of plover had its attendant dunlins, now likewise in the summer dress. All these birds were within three hundred yards of the embankment: I frequently observed them pick up some small object from the "flats," probably crabs which swarm in all the shallow pools.

*Bartailed Godwit.*—May 17th. Nine seen on the foreshore this afternoon; six, in company with gray plover and dunlin, were following the slowly receding tide, and working their long, slightly recurved bills with great perseverance: of these birds five were in the sober gray winter dress, the sixth only showing some patches of rufous on the under parts. Within two hundred yards of the bank was a group of three—one, the largest, in full plumage, from its size and some peculiarities in the colouring, I conjecture a female; I have never seen a finer or more richly coloured bird of this species. The ladies' companions were in sober gray, and, as yet, show no trace of changing their dress. My telescope, a powerful one, brought the group close up to my face: without changing my position amongst the long coarse sea-grass, I had, beside the godwits, sixty-one gray plovers, several hundred dunlins, and a few whimbrel and brown-hooded gulls, within easy telescope range—not an every day sight for an ornithologist. The cry of the godwit is a wild shrill whistle: on the wing they somewhat resemble a whimbrel, but are a slenderer looking bird, and their wings seem narrower and more pointed; their cry will, however, at once mark them. I do not consider the godwit a naturally wild and shy bird, but from their feeding almost invariably with curlew, whimbrel or gray plover, they rise with the rest of the company. One I shot some years since on our pasture land permitted me to walk up within short range.

JOHN CORDEAUX.

May 26th, 1869.

## *Notes on the Zoology of Newfoundland.*

By HENRY REEKS, Esq., F.L.S., &c.

(Continued from S. S. 1695.)

### Letter 3.—ORNITHOLOGY.

### HIRUNDINIDÆ—continued.

*Purple Martin*, Progne purpurea (*Linn.*)—This beautiful species appears rare in Newfoundland; at least I only obtained one specimen shot at Daniel's Harbour in June, 1868: the settlers did not seem to be acquainted with the bird, or know anything of its breeding habits.

(Note.—Of the Bombycillidæ Ampelis cedrorum, *Baird*, should be looked for in Newfoundland.)

### LANIIDÆ. The Shrikes.

*Great Northern Shrike*, or *American Butcher Bird*, Collyrio borealis (*Vieill*).—Visits Newfoundland in its periodical migrations, but appears rare. Perhaps a few remain to breed on the island, although I have no evidence at present to prove it.

*Yellowthroated Flycatcher*, Vireo flavifrons, *Vieill.*—A summer migrant, and appeared tolerably common in 1868; arriving in June at Cow Head.

### LIOTRICHIDÆ.

*Winter Wren*, Troglodytes hyemalis, *Vieill.*—Common, and resident throughout the year.

### CERTHIADÆ.

*American Creeper*, Certhia americana, *Bonap.*—Apparently a summer migrant, but not very common. I am inclined to think this bird may not migrate, although I did not observe it in the depth of winter.

*Redbellied Nuthatch*, Sitta canadensis, *Linn.*—Perhaps a resident on the island. The only one obtained was in April, 1868: it is certainly a rare bird at Cow Head.

### PARIDÆ.

*Blackcap Titmouse*, Parus atricapillus, *Linn.*—Common, and resident throughout the year. Breeds in holes in trees; sometimes adopts deserted holes made by Picus pubescens.

*Hudsonian Tit*, P. hudsonicus, *Forster.*—Common, and nonmigratory. Breeds in holes in trees, and associates with the preceding species in winter, at which season the juvenile Newfoundlanders frequently amuse themselves by calling these little birds around them and knocking them off the boughs with a stick, or even the ramrods of their guns: my specimens were obtained for me in this manner.

### FRINGILLIDÆ.

*American Pine Grosbeak*, Pinicola canadensis (*Briss*).—Common throughout the year, but apparently more abundant in winter, when they get together in small flocks of about two broods: they feed on the *buds only* of Pinus, Abies, Larix, &c., and are very tame, being often killed with sticks. Provincial name, "Mope."

*Yellow Bird* or *Thistle Bird*, Chrysomitris tristis (*Linn*).—A common summer migrant.

*Pine Finch*, C. pinus (*Wilson*).—A summer migrant, but apparently not so common as the preceding species.

From my short residence in Newfoundland the observations on the distribution of some of the smaller species belonging to the Fringillidæ, Sylvicolidæ, &c., may not be of much value; *e. g.*, it is very probable that some birds, especially of these families, which are not uncommon, and even generally distributed over the island, may have altogether escaped my notice, while, on the other hand, some rare, or otherwise not regular migrants may have fallen to my gun on more than one occasion during the summers of 1867 and 1868: in such cases I have naturally stated the birds to be frequent, or common, as the evidence may tend to show.

*American Crossbill*, Curvirostra americana, *Wilson*.—Common throughout the year, and an early breeder. Feeds on the seeds of Coniferæ, and is called by the settlers the "Large spruce bird," to distinguish it from the following species.

*Whitewinged Crossbill*, C. leucoptera (*Gmelin*).—These pretty little birds are common throughout the year, but more abundant during winter, when they congregate in small flocks of from five to twenty individuals, feeding principally on the cones of the white spruce (*Abies alba*). When feeding these birds are usually very tame, and easily approached. I kept an old "Joe Manton" loaded with small shot in the house, for the purpose of shooting crossbills and other small birds, and remember on one occasion snapping three percussion caps at a small flock of C. leucoptera, within fifteen yards of me, without causing them sufficient alarm to take wing. They have a very pleasing note, much resembling the song of the canary. The provincial name is "Spruce bird."

*Mealy Redpole*, Ægiothus linaria (*Linn*).—Very common, and does not migrate. Breeds early, and generally in alder bushes; hence its provincial name of "Alder bird." Feeds on the buds of Coniferæ, &c., when the ground is covered with snow.

*Snow Bunting*, Plectrophanes nivalis (*Linn*).—Very common in its periodical migrations, but I scarcely think breeds on the island, although I saw a good many there in June last (1868). Provincial name "Snow bird."

I did not meet with P. lapponicus (*Linn*), but it is probably seen on some parts of the island.

*Savannah Sparrow*, Passerculus savanna (*Wilson*). — Abundant throughout the summer: frequents grassy places, building its nest on the ground. Provincial name "Grass bird."

*Whitecrowned Sparrow*, Zonotrichia leucophrys (*Forster*). — A common summer migrant, arriving in May.

*Whitethroated Sparrow*, Z. albicollis (*Gmelin*).—A summer mig ant, and equally common as the preceding species. Arrives in May, usually towards the latter end of the month.

*Snow Bird*, Junco hyemalis (*Linn.*)—A summer migrant, arriving about the last of May, and tolerably common throughout the summer.

*Chipping Sparrow*, Spizella socialis (*Wilson*).—A common summer migrant.

*Fox-coloured Sparrow*, Passerella iliaca (*Merrem*). — This fine species of sparrow is a summer migrant and very common: it is called the "Hedge sparrow" by the settlers, and is very troublesome in gardens, scratching up fine seeds. Breeds sometimes on the ground, at others in low bushes.

### ICTERIDÆ.

*Rusty Blackbird*, Scolecophagus ferrugineus (*Gmelin*).—A regular and common summer migrant, remaining generally until after the first fall of snow.

*Crow Blackbird*, Quiscalus versicolor (*Linn.*)—A summer migrant, but rare; at least I only saw one specimen at Parson's Pond, about twelve miles north-east of Cow Head.

### CORVIDÆ.

*American Raven*, Corvus carnivorus, *Bartram*.—Common throughout the year. I think Wilson and Audubon were right in not separating this bird from the European C. corax. I cannot see the least difference—at least not more than would be found in examining a quantity of either species, if they are distinct. The more slender bill is more individual than typical of the American bird. The eggs certainly cannot be separated, but this is also the case with several of the Corvidæ, which are otherwise well marked and well-known species.

*American Crow*, C. americanus, *Audubon*.—A common summer migrant to Newfoundland, arriving in April. Frequents the sea coast: breeds in trees, and lays four or five eggs, much resembling those of C. frugilegus. It is called the "Otter crow" by the settlers.

Pica hudsonica (*Sabine*).—May reasonably be expected to occur in Newfoundland, but I am inclined to think it does so only as a straggler.

*Blue Jay*, Cyanura cristata (*Linn.*)—A summer migrant, but not common. Breeds in Newfoundland, and is called the "Silken Jay" by the settlers.

*Canada Jay*, Perisoreus canadensis (*Linn.*)—Common, and remains throughout the year. In some of its habits, and especially its familiarity, this bird much reminds the English sportsman of robin redbreast at home. When camping in the woods miles back in the country the Canada Jay, or, as it is often called, "Whiskey Jack," was ever my constant, and frequently only feathered, companion. Like others of its tribe it appears very partial to raw meat for food, although when in the vicinity of houses becomes almost omnivorous, eating bread, fish, potatoes, &c., with an evident relish. It is said to collect and store away large quantities of cranberries for winter use. I have never met with any of these "stores," but have often noticed the jays picking the berries, especially in the spring of the year where the snow has disappeared in patches in the open marshes. In a state of nature I think the Canada Jay is even tamer than the robin: I remember on one occasion, particularly when deer-hunting in the country, I had the hearts of three caribou hanging to the "tilt," or camp, within four feet of my head, and although unable to leave the "tilt" for the whole day from bad weather, the jays managed to eat all the fat from the hearts, notwithstanding I continually drove them away, but, like vultures and carrion crows, with every reappearance their seemed a reinforcement, until at last to save my venison I had to amuse myself by firing balls at them from my rifle as they sat on and picked a fine fat quarter of caribou only a few yards distant from the camp. My specimens were obtained by tying a piece of meat to the pan of a rat-gin and retiring a few yards from the trap: they were invariably caught by the bill. The settlers, strange to say, cannot succeed in keeping this bird alive in confinement.

I did not meet with any of the Columbidæ in Newfoundland: Ectopistes migratoria (*Linn.*) may prove an occasional straggler there.

## TETRAONIDÆ.

*Canada Grouse*, or *Spruce Partridge*, Tetrao canadensis, *Linn.*—A very rare and uncertain visitor from the mainland: two killed, and two others seen by the settlers during my residence at Cow Head.

*Willow Grouse*, Lagopus albus (*Gmelin*).—Common throughout the year, and the only lowland or subalpine species indigenous to Newfoundland. From my own experience I think the willow grouse invariably roost on the ground, although I have frequently shot them when feeding in the tops of birch and alder trees, more especially when the ground is covered with deep and light snow. Their food consists chiefly of the buds and tender shoots of birch, alder, black spruce (*Abies nigra*), juniper (*Larix americana*), &c., but they seem partial at other seasons to the partridge berry (*Mitchella repens*) and cranberry (*Oxycoccus palustris*). I do not possess specimens of willow grouse from Europe or northern North America (Hudson's Bay, &c.), but Professor Baird says, "I find a considerable difference in different specimens of the large ptarmigan [L. albus] before me. Those from eastern Labrador and Newfoundland appear to have decidedly broader, stouter and more convex bills than those from the Hudson's Bay and more northern countries. I think it not improbable that there may be two species. . . . ." Professor Newton, however, informs me that "none of Professor Baird's later writings have gone to strengthen the suspicion expressed by him formerly as to the existence of a second species of willow grouse," and adds, "I have compared a pretty good series of skins from many parts of North America, extending from Alaska to Newfoundland, and so far as I can judge I have no doubt they are all of one and the same species, which is further identical with the willow grouse of Europe (*Tetrao saliceti*, Temminck; *T. subalpinus*, Nilsson)." I have never succeeded in driving the willow grouse into a bank of snow, as Sir John Richardson states in 'Fauna Boreali Americana,' vol. ii., p. 352, as being a habit peculiar to the species, nor had the settlers observed anything of the kind. They are sometimes so tame that they may be killed with a stick; at other times so wild that they will not allow you to approach within gunshot, and such is generally the case in winter when the snow is hard and crusty, and the noise of your rackets (snow-shoes) alarms them. They are shot at all seasons by the settlers, and generally when sitting on the ground, although there is every excuse for doing so, especially in thick woods, for if once flushed there is rarely a chance of coming up with the covey again, and this is an important consideration where food and powder and shot are not too plentiful among the poorer population. In one of my walks soon after I landed on the island I came up with a small covey of willow grouse and killed a brace, but owing to my dog—a borrowed one, which was evidently more used to rushing into the water for wounded seals and ducks, than retrieving grouse,—I was unable to get another shot at the birds. Upon showing the brace I had killed to the owner of the dog, on my return, the following conversation ensued:—"Got two *pattridges* then, sir?" "Yes." "All there was there, I 'spose?" "Oh, no; there were ten in all, I think." "Then they was wild I 'spose, sir?" "No, they allowed me to get sufficiently near to kill one with each barrel as they rose." "What, sir, you never fired at 'em to wing!" "Of course I did; how would you have me shoot at them?" "Why, sir, if I had been there I should have walked round and round them *pattridges* till I had got 'em all in a heap, and then I should have killed nearly all at a shot: I never heard of nobody firing at a *pattridge* to wing." If the settlers could be induced to observe a close time for these and other valuable game birds, the practice of shooting them in this apparently wholesale manner would not greatly diminish their numbers. The willow grouse is called *the* "partridge" by the settlers, and frequents beds of alder and dwarf birch in swampy places, especially on the borders of lakes and rivers. It breeds on the ground among stunted black spruce, in rather drier situations. One peculiarity in the Newfoundland bird is, that I have *very rarely* found the middle, or incumbent pair of tail-coverts "entirely white" in winter, as they are stated to be in 'Birds of North America,' p. 634.

*Rock Ptarmigan*, L. rupestris (*Gmelin*).—A truly alpine species in Newfoundland; rarely found below the line of stunted black spruce, except in the depth of winter, when they descend to the low land and feed on the buds of dwarf trees, sometimes in company with the willow grouse, but I never saw this species perch on trees: it is called by the settlers the "mountain partridge."

## GRUIDÆ.

I was informed by one of the settlers that a "brown crane" was killed a few years since at Codroy, Newfoundland, and some others seen. I am of opinion that they must have been "stragglers," and it is therefore hard to determine the species. Did they really belong to the genus *Grus?*

### ARDEIDÆ.

*American Bittern*, Botaurus lentiginosus (*Montagu*).—A summer migrant to Newfoundland, and the only species of the heron family that I met with. A pair of bitterns are generally found frequenting the margins of wooded lakes and ponds in the lowlands throughout the summer, arriving early in May and departing again about the last of September. Yarrell describes the legs and feet as "greenish brown;" they are, however, of a pretty yellow-green, but soon lose this colour after death. The American bittern makes a curious thumping noise, very much resembling the noise made by fishermen when driving oakum into the seams of their boats; hence probably arose its popular name of "stake-driver" in the United States, and "corker" (? caulker) in Newfoundland.

### CHARADRIDÆ.

*American Golden Plover*, Charadrius virginicus, *Borck.*—Visits Newfoundland abundantly in the autumnal migration, but very rarely, if at all, in the vernal.

*Killdeer*, Ægialitis vociferus (*Linn.*)—Not so common as the preceding, otherwise the remarks on that species are equally applicable here.

*Ring Plover*, or *Semipalmated Plover*, A. semipalmatus (*Bon.*)—A summer migrant and breeds on the coast: this and the following species are called "beach birds."

*Piping Plover*, A. melodus (*Ord.*)—Appeared to be a common autumn migrant, congregating in large flocks.

*Grey Plover*, or *Blackbellied Plover*, Squatarola helvetica (*Linn.*)—Very common in the fall of the year, but I did not meet with it in Spring: the plovers evidently take some other, and probably more direct route than *viâ* Newfoundland to their breeding grounds in the far north.

### HÆMATOPODIDÆ.

*Turnstone*, Strepsilas interpres (*Linn.*)—Abundant on the sea-shore in the fall of the year, and generally so fat that the settlers have bestowed on it the appropriate name of "fat oxen."

Of the Recurvirostridæ I did not meet with either Recurvirostra americana, Gmelin, or Himantopus nigricollis, Vieillot, although both, but more especially the former, may reasonably be expected to occur periodically.

## PHALAROPODIDÆ.

*Red Phalarope,* Phalaropus fulicarius (*Linn.*)—Visits Newfoundland generally in the month of June, and is sometimes tolerably common, but I doubt whether it breeds on the island. This is undoubtedly our old friend Phalaropus lobatus in its nuptial dress, and the American authors have done well in restoring to it the Linnean name of fulicarius, because it is yet a matter of doubt whether the Tringa lobata of Linnæus in Systemæ Naturæ ever applied, or was intended to apply, to this species. It is the only species of phalarope I got in Newfoundland, and was called by the settlers the "gale bird." It is wonderful to watch these pretty and delicate-looking little birds swimming and taking their tiny food from the crests of waves that would "swamp" any boat and many schooners. They are very tame, and swim almost within arm's length of the rocks, giving one the idea that the next immense wave which is fast approaching will cast them on shore, or smash them against the rocks: at such times it takes a quick shot to kill them on the water.

## SCOLOPACIDÆ.

*European Woodcock,* Scolopax rusticola, *Linn.*—A single specimen is said to have been killed in the neighbourhood of St. John's, in January, 1862 (See 'Ibis,' 1862, pp. 284, 285). If no deception has been practised here, it is certainly a very extraordinary capture, as is also that of another specimen since taken near New York. To those who have spent any length of time on the coast of North America, the problem of the occurrence of so many American birds in Europe is soon solved: it is undoubtedly caused by the prevalence, especially in the fall, of great gales of westerly winds, which probably take most of our American stragglers off the east coast of Newfoundland; but how to account for the appearance of two stray specimens of S. rusticola being killed in America—far apart, but in each case near a populous city, and by those so well up in ornithological literature as to be aware of the value of such captures, presents a difficulty by no means so easily disposed of. Of course it is probable that land birds may occasionally get blown off our west coasts by rough easterly winds, but it is equally probable that before they had gone one-third across the Atlantic they would take the wind dead ahead, which would cause them to 'bout ship and be thankful for a fair breeze home. It does not require a great stretch of the imagination to account for the appearance of an Icelandic species in Greenland, or the northern parts of the American continent, or even in Newfoundland, but if I remember right the European woodcock is not found in Iceland.

*American Woodcock*, Philohela minor (*Gmelin*).—Probably occurs on the island, but my accident prevented my thoroughly searching situations likely to produce this species. It would only occur as a summer migrant.

*Wilson's Snipe*, Gallinago Wilsoni (*Temm.*)—A common summer migrant, arriving generally about the last week in April, and soon commences breeding. When the female is sitting on her nest the male frequently rises in the air, drumming and making a peculiar rushing noise with its tail, which may be heard a considerable distance.

*Gray Snipe*, Macrorhamphus griseus (*Gmelin*).—A summer migrant. The remarks appended to the preceding species appear equally applicable to this.

*Gray Back ; Robin Snipe*, or *Knot*, Tringa canutus (*Linn.*)—Visits Newfoundland only in its periodical migrations.

*Purple Sandpiper*, Tringa maritina, *Brunnich.*—A summer migrant, but rather rare at Cow Head; probably more common on the southern shores of the island.

*American Dunlin*, T. alpina, var. americana, *Cassin.*—A summer migrant, but much more abundant in the fall of the year.

*American Jack Snipe*, T. maculata, *Vieill.*—A summer migrant, and tolerably common.

*Least Sandpiper*, T. wilsonii, *Nuttall.* — A common summer migrant.

*Bonaparte's Sandpiper*, T. bonapartii, *Schlegel.*—A common summer migrant, collecting in flock in the fall of the year at the seaside, and generally so tame that a dozen to twenty may often be killed at a shot. This remark applies also to some other allied species of sandpipers and small ringed plovers which congregate on the coast every autumn, from some flocks of which upwards of sixty have been killed at a shot; giving some idea of the immense quantities of these little birds. The pretty little pigeon hawk (*Falco columbarius*) is a cruel attendant on these flocks of small Tringæ. Professor Newton informs me that "Tringa bonapartii is the Schinz's Sandpiper of Yarrell and other English authors, though not the true *T.* schinzi."

*Sanderling*, Calidris arenaria (*Linn.*)—Visits Newfoundland periodically: abundantly in the fall, but very sparingly, if at all, in the spring.

*Semipalmated Sandpiper*, Ereunetes petrificatus, *Illiger*.—Another common species on the coast in the fall.

*Stilt Sandpiper*, Macropalama himantopus (*Bon.*)—Not common at Cow Head. I killed one specimen in September, 1867, and saw a few others which appeared of the same species.

*Willet*, Symphemia semipalmata (*Gmelin*).—Common in the fall of the year, especially in the spotted or immature plumage.

*Tell Tale*, or *Stone Snipe*, Gambetta melanoleuca (*Gmelin*).—A summer migrant, but not so common as the following species.

*Yellow Legs*, or *Yellowshanked Sandpiper*, G. flavipes (*Gmelin*).—A summer migrant, arriving in May and departing again in October. A great many pairs breed in the marshes, but I think the majority pass on to more northern regions, and return in August and September in increased numbers, generally at that season very fat and much appreciated for the table, but being small birds they are not usually shot at by the settlers unless four or five can be killed at a shot. Sometimes they are very tame and take little notice of men or dogs: at other times they are so wild that I know no bird more difficult of approach, and then they are a perfect nuisance to the sportsman, as they not only keep out of range themselves, but alarm every other bird by their incessant cry of "twillick," "twillick." Many a blessing (?) have I bestowed on these birds when, after crawling on my hands and knees a quarter of a mile through long wet grass on boggy soil to get a shot at a flock of black ducks (*Anas obscura*), I have heard the everlasting "twillick," and seen the ducks take wing instantly, perhaps not eighty yards from me. I fear since my visit many a skeleton of poor "twillick" lies bleaching in the marshes by the sea-coast near Cow Head. Provincial names of this bird are "twillick," "twillet" and "nansary"—the latter name more frequently in the south of the island.

*Solitary Sandpiper*, Rhyacophilus solitarius (*Wilson*.)—Not uncommon in summer, generally towards autumn.

*Spotted Sandpiper*, Tringoides macularius (*Linn.*)—A common summer migrant, arriving early in May: breeds on the coast, and lays its four eggs sometimes in a hollow on the bare shingle; at other times in short grass, but always just above high-water mark. Provincial name "wagtail."

*Bartram's Sandpiper*, Actiturus bartramius (*Wilson*).—Visits Newfoundland periodically, but is rarely met with during the vernal migration. I doubt if it breeds in Newfoundland, although known to do so on the mainland both north and south of that island. Like the peewit at home this species prefers inland and cultivated districts.

*Buffbreasted Sandpiper*, Tryngites rufescens (*Vieill*).—A summer migrant, but not very common. I did not succed in taking eggs of this species, but I think it breeds on some of the drier spots in marshes in Newfoundland.

*Marbled Godwit*, Limosa fedoa (*Linn.*)—Only a periodical visitor; most common in the fall. This and the following species are called "dotterels," by the settlers.

*Hudsonian Godwit*, L. hudsonica (*Latham*).—Visits Newfoundland in its periodical migrations, but is most common in the fall of the year, when it is generally very fat and much appreciated for the table.

*Longbilled Curlew*, Numenius longirostris, *Wilson*.—A periodical migrant much sought after by the settlers, who are great adepts in imitating its whistle, by which means they kill many that would otherwise pass a long distance out of range. It is a fat, good-eating bird in the fall.

*Hudsonian Curlew*, N. hudsonicus, *Latham*.—Frequently confounded by the settlers, under the name of "Jack Curlew," with the preceding species, with which it is about equally common, and like that visits Newfoundland in its migrations, but does not breed there.

*Esquimaux Curlew*, N. borealis (*Forster*).—By far the most common species of curlew, but like the preceding species is only a periodical visitor; coming by thousands in the fall, but very rarely in the spring; in fact, I think they take some other and more direct route at that season. They feed on the berries of *Empetrum nigrum*, which stain the feathers posteriorly a rich dark purple. These birds arrive in Newfoundland on their migration about the last week in August, and remain until the end of September, when they are always very fat, and delicious eating. I was told by one of the old English settlers that they were so abundant some seasons that he had himself shot fifty in one morning before sunrise.

*Virginia Rail*, Rallus virginianus, *Linn.*—A summer migrant and apparently rare: I saw only one specimen; but the well known habits of the *Rallidæ*—that of concealment among reeds in marshy places—may account for a seeming paucity in individuals.

*Common American Rail*, Porzana carolina, *Vieill.*—A summer migrant, and, although not common, is probably more so than the preceding.

*American Coot*, Fulica americana, *Gmelin*.—Although this bird is perhaps a regular summer migrant to Newfoundland I never met with it, neither do I think it is *the* "Coot" of the settlers; if so, I know it is frequently confounded with *Pelionetta perspicillata* (*Linn.*), the surf scoter.

### ANATIDÆ.

*American Swan*, Cygnus americanus ? *Sharpless*. — Apparently a rare and accidental visitor to the western coast of Newfoundland: I saw only one specimen, which was an adult bird flying, south in the fall of 1867.

*Snow Goose*, Anser hyperboreus, *Pallas*.—Very rare: I heard of one or two being obtained in the north of the island, and an equal number on the west coast.

*American Whitefronted Goose*, A. gambeli, *Hartlaub*.—Equally rare with the preceding, or perhaps more so. It seems extraordinary that these two common species of American geese should be so rare when we consider that Newfoundland, in one place, is only separated by twelve or fifteen miles of water from the mainland.

*Canada Goose*, Bernicla canadensis (*Linn.*)—A regular summer migrant, and by far the most abundant species, arriving in April and in May by "countless thousands." The majority pass on to more northern regions to breed, although a great many remain for that purpose in Newfoundland; but, besides a general discrepancy in size, I have almost invariably found the northern migrants of this species much darker on the breast; in fact so much so that we used to call them the "little blackbreasted northerners." The colour of the "down" appears a good distinction between the sexes: on the male it is light gray, and on the female dark gray, almost black. This was pointed out to me by the settlers, who, however, know how to separate the sexes by the shorter bill and head of the goose. The Canada goose is greatly prized for the table, and the settlers are adepts in "toling" them within gunshot in the spring of the year, but it cannot be done in the fall, or during the autumnal migration: a dog is generally used for this purpose. The sportsman secretes himself in the bushes or long grass by the side of any water on which geese are seen, and keeps throwing a glove or stick in the direction of the geese, each time making his dog retrieve the object thrown: this has to be repeated until the curiosity of the geese is aroused, and they commence swimming towards the moving object. If the geese are a considerable distance from the land, the dog is sent into the water, but as the birds approach nearer and nearer the dog is allowed to show himself less and less: in this manner they are easily toled within gunshot. When the sportsman has no dog with him he has to act the part of one by crawling in and out of the long grass on his hands and knees, and sometimes this has to be repeated continuously for nearly an hour, making it rather a laborious undertaking, but I have frequently known this device succeed when others have failed. The stuffed skin of a yellow fox *(Vulpes fulvus)* is sometimes used for toling geese, and answers the purpose remarkably well, especially when the geese are near the shore, by tying it to a long stick and imitating the motions of a dog retrieving the glove or stick. Foxes have frequently been observed to practice the same device in a state of nature, and the settlers who prize fur more than feathers commence toling poor Reynard within range of the fatal shot, which, strange to say, considering the general craftiness of the animal, is very easily done. The Canada goose may often be toled from a long distance when on wing by "cronking" or imitating its cry. When these geese fly either in pairs or in flocks a gander invariably leads: this fact is so well known to the settlers that when firing at a pair of geese they invariably shoot at the hinder bird, not only because the goose is the fattest (in the spring), but because the gander will generally fly round and round its dead mate for some little time: such affection but too often proves fatal, especially when the shooter has the use of two barrels, but such is not generally the case among the settlers, who chiefly use the old-fashioned long duck guns, single barrelled, of ten or twelve bore. Ice-gazes and false geese are also employed on the ice for killing these beautiful birds in the spring of the year. Like the domestic goose, which has been known to live upwards of a hundred years, these birds are supposed by the settlers to live to a great age. A few years ago a specimen of the Canada goose was shot at Grosswater Bay, on the Labrador, which had a thin brass collar on its leg initialed and dated just thirty years previous to its capture. This species does not commence laying until three years old, and from examining the ovaries of several evidently young females I found them to contain from 180 to 190 eggs, which, averaging six per annum, would limit the laying period to some thirty or thirty-one years; so that, bar accidents, the birds would not probably live more than forty or forty-five years.

*Brent Goose*, B. brenta, *Stephens*.—Very common on the southern and western parts of Newfoundland in its periodical migrations, but very rare farther north than St. George's Bay, in 48½ N. latitude, or occasionally Port au Port, whence it crosses to Anticosti and thence up the Labrador shore. Two specimens were said to have been seen on wing at Cow Head last spring (1868), but the double-crested cormorant (*Graculus dilophus*) flies much like a small goose, and I fancy the birds thought to be Brents were of this species.

*Mallard*, or *Common Wild Duck*, Anas boschas, *Linn.*—Very rare: I only examined one normal specimen of this species, also one of the supposed hybrids between this species and the muscovy (*Cairina moschata*), which had been shot and skinned by two of the settlers a few years since, and preserved as curiosities. The larger bird was considered by them a drake of the domesticated variety, and I have certainly seen some of the descendants of the "Lincolnshire" breed much resembling it, but as I was informed no ducks except eiders (*S. mollissima*) were kept domesticated on the island, the bird had probably wandered north in company with a flock of some other species.

*Black Duck*, A. obscura, *Gmelin.*—This is the common wild duck of the island, and is abundant throughout the summer. It breeds among rushes and long grass on the borders of lakes and rivers, and lays from ten to fifteen eggs, which much resemble those of the preceding species. The black duck is much esteemed for the table, but is usually a very shy bird, and not easily approached except from the leeward, as it will "wind you like a deer."

*Pintail Duck*, Dafila acuta (*Linn.*)—Very rare, but known to some of the settlers as the "long-tailed duck."

N.B.—The true "long-tailed duck" (*Harelda glacialis*) is called a "hound" in Newfoundland.

*Green-winged Teal*, Nettion carolinensis (*Gmelin*).—A summer migrant, and appears to be the "common teal" of the island.

*Blue-winged Teal*, Querquedula discors (*Linn.*)—Rare in the neighbourhood of Cow Head, and probably nowhere on the island so common as the preceding species.

*Shoveller*, Spatula clypeata (*Linn.*)—A summer migrant, and generally distributed over the island, but is by no means common. It is called "pond diver" by the settlers.

*Gadwall*, or *Gray Duck*, Chaulelasmus streperus (*Linn.*)—Rare: does not breed on the island, but is occasionally killed during its periodical migration.

*Baldpate*, or *American Widgeon*,* Mareca americana (*Gmelin.*)—A common summer migrant, and when fat one of the best flavoured of American ducks. The adult male of this species, which is called a "cock widgeon" by the setlers, is, in summer plumage and fresh killed, one of the handsomest ducks in Newfoundland.

*English Widgeon*, M. penelope ? (*Linn.*) — Although only a straggler to the continent of North America, it is not improbable that this species occasionally occurs in Newfoundland, especially *en route* from Greenland to the United States, whence most of the captures are recorded.

*Scaup Duck*, or *Big Blackhead*, Fulix marila (*Linn.*)—A very rare straggler to the N.W. coast.

*American Scaup Duck*, F. affinis (*Eyton*).—Occasionally shot in spring or fall, but rarely seen at Cow Head.

*Ring-necked Duck*, F. collaris (*Donovan*).—Equally rare with the preceding species.

Aythya americana (*Eyton*) and A. vallisneria (*Wilson*) may reasonably be expected to occur in Newfoundland.

*American Golden Eye*, Bucephala americana (*Bon.*)—A very common summer migrant; one of the first to arrive in spring, and remains until frozen out in the fall. Breeds in holes in trees, sometimes near the ground, but very frequently fifteen or twenty feet high, and often a considerable distance from water. The hole is generally made in a rotten tree, and I think always by the bird itself: it is called the "pie duck" by the settlers, and the young birds are considered good eating.

*Buffel-headed Duck*, or *Butter Ball*, B. albeola (*Linn.*)—Rare; at least at Cow Head, where it is called the "Spirit duck."

*Harlequin Duck*, Histrionicus torquatus (*Linn.*) — A common summer migrant, and breeds on the borders of lakes and rivers flowing into the sea, frequently many miles in the country, whence it brings its young in July. The male of this species, which is called a "lord" in Newfoundland, is decidedly the handsomest little duck inhabiting those cold regions, and is a most expert diver. It seems extraordinary that any bird when quietly settled on the water, and within twenty yards of you, should escape by diving from the shot of a percussion gun; but how far more astonishing is it that birds on the wing, and within easy range, should employ the same device, and yet the little "lords" and "ladies" (females) frequently escape by doing so! The amateur sportsman, unacquainted with this fact, is amazed at his own prowess, when, having shot at eight or ten of these birds on the wing. he sees the whole flock drop apparently "stone dead" into the water; but his vexation perhaps exceeds his amazement when, in a few seconds, he again sees his little flock of harlequins on wing, and that too just out of range for his second barrel. The harlequin duck is frequently found sitting on rocks many feet above the water, but, from its small size and resemblance to the parti-coloured rocks, is very difficult to see in time to get a shot by stalking. Adult males are generally distinguished as "old lords," and females as "jennies."

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* A male *Mareca* which I obtained in Newfoundland differs from type specimens in being of an uniform dark brown on the back, without the ordinary transverse bars; in its smaller size (*barely* 19 inches; wing 10; tarsus 1.10); legs and feet blue; irides WHITE; culmen less convex; and by having a broad conspicuous white band on the wings. Mr. G. R. Gray and Professor Newton are unable to refer the specimen to any other species than *M. americana.*—H. R.

*Long-tailed Duck*, Harelda glacialis (*Linn.*) — This handsome species is very common all along the coast in fall and spring,—in fact, as long as there is any open water throughout the winter; but I think does not breed anywhere in Newfoundland, although I have an adult male in summer plumage which was shot at Cow Head on the 13th of June, 1868.

To the naturalist and sportsman there can be few more interesting sights than seeing several hundreds of "hounds," as these birds are called by the settlers, in a flock, and hearing their clamorous cry of "Cow-cow-wit," "Cow-cow-wit," which, when borne on the breeze from a distance, has a fancied resemblance to a pack of hounds in full cry, and, however fanciful the comparison, it always proved sufficiently obvious to recall many pleasant reminiscences of bygone days. The longtailed ducks usually frequent shoals and beds of "killup" (kelp) in one to five fathoms of water, but I have seen them diving for food in thirty fathoms of water. Like many other oceanic birds they are expert divers, and it is sometimes almost impossible to kill them when sitting on the water; and I really think the nearer you are to them the more likely are they to evade the shot, but, of course, everything depends on the day; if dull and cloudy, or with snow on the ground, they dive at the flash with the rapidity of lightning, while on bright sunny days they are shot as easily as any non-diving birds. On the 12th of October, 1867, I killed two males of this species at a shot. It was a lovely day, frosty in the morning, but the thermometer marked 50 degrees Fahr. at noon, and the ducks which were fishing side by side, at the distance of about forty yards, made no attempt to dive. "Old Wife" is another provincial name for this species.

*Labrador Duck*, Camptolæmus labradorius (*Gmelin*).—Probably occurs on some parts of the coast, but I did not meet with it during my stay at Cow Head.

*Velvet Duck*, Melanetta velvetina (*Cassin*).—Common, and probably breeds on the island, as individuals may be seen throughout the summer; although supposing the birds to assume the adult plumage the *second* year, which I have reason to doubt, they may be non-breeding birds, as they certainly do not breed until the *third* year. Provincial name "Whitewinged diver."

*Surf Duck*, Pelionetta perspicillata (*Linn.*)—Common, especially during the migratory season. The remarks on the plumage and breeding habits of the preceding species applies equally to this and the following species. Provincial names "Bottle-nosed diver" and "Bald coot."

*American Scoter*, Œdemia americana (*Swainson*).—Very common throughout the year; at least until driven from the coast by drift ice, which is not usual until the first week in January. It is called the "sleepy diver" and "little black diver" when adult, by the settlers.

*American Eider Duck*,* Somateria mollissima? (*Linn.*)—By far the most abundant species of duck in Newfoundland, but not so plentiful now as a few years since, owing in a measure to an increase in population, but more particularly to a wholesale robbery of eggs which is carried on with impunity from the islands along the coast, and others in the Straits of Labrador and Belle Isle. Several hundreds of these beautiful ducks breed on some islands in the Bay of St. Paul, about five miles west of Cow Head, and are strictly preserved by an old Englishman, the only human resident in the bay. So abundant were these birds in Newfoundland a few years ago that a man living at Cow Head killed *one hundred and ten* eiders at *two* shots in one day, and on another occasion *fifty-three* at *one* shot: forty, also, had frequently been killed at a shot, and I saw a youth, seventeen years of age, knock down twenty at a shot in January, 1868, but even this last number now is rarely obtained so easily. To the sportsman who is content with a duck to each barrel this comparative scarcity is of small import, but to the poor settlers it is a matter of great consideration. The common eider does not breed or assume the adult plumage until the third year: it is called the "sea duck" by the settlers. The young males resemble the females, but lack the tinge of reddish brown which is characteristic of adult females of this and the following species.

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* Professor Newton is of opinion that the American eider differs from the European far more strikingly than do some other so-called American species of ducks (especially the genus *Œdemia*), and I quite agree with him.—H. R.

*King Eider*, S. spectabilis (*Linn.*)—The adult male of this species is a large handsome bird and much sought for by ornithologists, especially those who go to the trouble and expense of visiting either its summer or winter haunts. The king eider, which is called "king bird" in Newfoundland, is tolerably common during its periodical migrations, and is frequently shot in company with the preceding species. On the 17th of December, 1867, I obtained an adult male "king bird;" and on the 19th an immature male: the latter was one of two killed at a shot with eight of the common eider. King eiders are more abundant some seasons than others: in 1865 twenty of these birds were killed at a double shot by one of the settlers at Cow Head. Young males the first year resemble the females, but in the second year have the throat and neck copiously spotted with white. The adult female of this species is easily separated from its congener (*S. mollissima*) by its much smaller size, its shorter bill, and by having a more decided rufous tinge on the upper plumage.

*Ruddy Duck*, Erismatura rubida (*Wilson*).—A rare and uncertain visitor on the north-west coast.

*Goosander*, Mergus americanus, *Cassin*.—A summer migrant and tolerably common: it breeds on the margins of lakes and rivers, and is called the "gozzard" by the settlers.

*Redbreasted Merganser*, M. serrator, *Linn*.—A very common summer migrant, remaining in Newfoundland as long as any open water can be found. At early morning the redbreasted mergansers fly out to sea in large flocks, but return to fresh water in the evening: its provincial name is "shell bird."

*Hooded Merganser*, Lophodytes cucullatus (*Linn.*)—Apparently rare on the north-west coast, and generally obtained in the immature plumage.

HENRY REEKS.

Thruxton, Andover.

(To be continued.)

## *Ornithological Notes from Shetland.*

### By H. L. Saxby, M.D.

### 1868.

*Whitetailed Eagles.*—Still build in Feltar and Yell. From the last named locality I obtained two fresh eggs on the 14th April; both were of the usual roundish form, measuring three inches in length by two inches and three-eighths in breadth. In colour they were soiled-white, with a few faint brownish stains. The shells were remarkably hard. The nest was placed in a high sea-cliff, rather nearer to the top than to the bottom, in such a position beneath the overhanging rocks that it could only be reached by means of a rope: it consisted of a mass of dead plants and seaweed stalks, thickly covered about the middle with wool and hair. Although both birds were seen they were very shy, as is usually the case before incubation has fairly commenced. Last year a pair which had newly hatched became a great annoyance in this neighbourhood, although the nest was in an island about eight miles distant in a straight line: so bold did they become that at last they would carry off poultry from the cottage doors, when the men were at the fishing—treating the women and children with the utmost contempt. Some years ago, one of the same pair made a pounce upon a tame duck which was feeding in a barn-yard, but being alarmed by a man who came out to the rescue, merely succeeded in seizing one foot, by which, however, the miserable captive was carried to the distance of about half a mile, "roaring for mercy," as my informant asserted; the eagle then descended to a hillock, and, taking a firmer hold, rose once more and continued its way to the eyrie.

*Sclavonian Grebe.*—From May 5th to June 18th two Sclavonian grebes, in full summer plumage, were constantly to be seen upon the Voe: they seemed to prefer shallow water among small rocks.

*Crossbill.*—On the 11th June I saw a crossbill in bright orange plumage at Halligarth, but no others until the latter part of July, when very large numbers appeared at Scaa, in the north of this Island. The inhabitants shot and stoned them by dozens at a time, never having seen birds of the kind before: they were in various states of plumage, but young birds of the year were by far the most numerous: the stomachs of all that I examined contained sand and small seeds. The survivors continued in the same neighbourhood for about a fortnight, keeping about the corn yards and the small patches of cultivated ground surrounding them, never appearing at Baltasound, although at Scaa there is nothing in the shape of a bush, and even the very weeds are dwarfed.

*Turnstone.*—On the 13th June I obtained a fine pair of turnstones in summer plumage.

*Fulmar and Manx Shearwater.*—I have found the jaws of small cuttlefish in the stomach of both these birds. (See Mr. Gurney's notes, Zool. S.S. 1483—1603).

*Quail.*—On the 25th September a woman brought me eight eggs of the common quail, which she had just found while reaping a small field of oats. She stated that a few weeks previously she had observed a bird resembling a small landrail in the same field, but as it suddenly disappeared it was supposed to have been killed by a cat: there were ten eggs in the nest, but two were accidentally broken; the eight now in my possession are of the usual dingy yellow, blotched and speckled with various shades of umber-brown; the average size is one inch two lines in length by eleven lines in breadth: all were addled. I have not heard of the occurrence of the quail in any part of Shetland.

*Spotted Woodpecker.*— After an absence of eight years the spotted woodpecker (*Picus major*) has again visited our islands. On the 26th of September I heard of one at Uyeasound, and within the next few days others were seen in all parts of Unst. Many specimens, both males and females, were sent to me, but none were in adult plumage. Upon the occasion of the last visit of this species (Zool. 7932) there was one adult bird, and all that I examined were males. The latest specimens received by me had the bill, tail and claws much worn: one was caught alive and placed in a herring-barrel, but climbed out of it with ease, greatly to the astonishment of the beholders. This flock, like the last, appeared with a steady S.W. wind.

*Hedgesparrow.*—On the 5th of October (wind S.E.) I observed a hedgesparrow—a bird until that time unknown in Shetland—in the garden at Halligarth.

*Greenfinch.*—On the 13th of October a flock of many hundred greenfinches arrived at Halligarth. Wishing to obtain specimens without causing unnecessary slaughter, I resorted to a very effectual method of obtaining a number of living birds from which to make a selection: visiting the roosting places after dark a companion threw the light of a bull's-eye lantern upon the birds, while I crept softly behind them and seized as many as I required in my hand, slipping each one as it was captured into a covered basket. Although none of the trees exceed fifteen feet in height, they would still have been too tall for us had not the birds chosen the branches below the level of the wall top, for the sake of avoiding the cold wind. The result of our last attempt was the capture of twenty-seven greenfinches, two house sparrows and a chiff-chaff: several times we caught bramblings and chaffinches. When the greenfinches first appeared the wind was N.W., but for some days previously it had been blowing strongly from S. and S.W.

*Siskin.*—On the 15th of October, during a gale from S.W., a siskin was shot on the jetty below Buness.

*Goldeneye.*—On the morning of the 27th October a woman brought me a female goldeneye, which she had caught about an hour before in a burn which runs out of the Loch of Quoyhouse: her attention was first attracted by a frequent splashing in the water and the eager behaviour of a dog which was running up and down the bank, evidently on the watch for something—a large fish, the woman imagined: running to the spot where it last disappeared, she indistinctly saw some dark object near the bottom of the channel, when—still supposing it to be a fish, for the ripple was very strong—she plunged in her hand, and to her surprise brought up a bird. On my questioning her, she told me that it held quite tightly to the weeds, and "came up feet foremost." From this, and also from the fact that the head was pointing towards the upper part of the stream, there can be no doubt that the bird was holding on to the weeds, though whether the bill was above the surface or not is uncertain: the plumage was so saturated with wet, probably from the extremely heavy rain, that flight was impossible, otherwise the bird would have escaped by flight. I kept it living for some time: when irritated it erected the feathers of the whole head, causing that part to appear disproportionately large. In a former volume of the 'Zoologist' (Zool. 9436) I have recorded a remarkable instance of the escape by diving of a bird of this species.

*Longeared Owl.*—On the 28th October, a strong N.W. wind brought a longeared owl to the garden at Halligarth, where, after some little trouble, for it was very shy, I killed it several days afterwards. It proved to be an adult female: the stomach was full of mice—a fact at which I was surprised, for at that time the garden was swarming with small birds. The longeared owl is n other addition to the Shetland list.

*Oystercatcher.*—An oystercatcher was seen here on the 11th November, and another on the 25th December: it is very seldom indeed that it is seen here in winter, although it is resident in Orkney throughout the year (See Zool. 9091).

*Albino Starling.*—I am informed by the Rev. D. Webster, minister of Fetlar, that, during the early part of the winter, he repeatedly observed a pure white starling. Macgillivray states that he has "not seen any British specimen either white or spotted with that colour," while Yarrell believes such varieties to be "not uncommon."

*Gannet.*—During the month of December a considerable number of gannets appeared here, all of them in adult plumage: one which I had wounded, finding itself unable to rise, rushed open-mouthed at the boat, never stopping until it had driven its bill against the planks. Several of these curious birds were caught inland, but in almost every instance they contrived to inflict rather severe cuts upon the hands of their captors.

### 1869.

*Rook.*—On the 2nd March (wind N.E.) three rooks were seen at Buness.

*Peregrine Falcon.*—Four fresh eggs of the peregrine falcon were brought to me from Burrafirth on the 24th April.

*Snowy Owl.*—A snowy owl was shot at Crushafiel on the 12th April.

*Crane* (Grus cinerea).—On the 11th May I heard that two cranes were in the island, but my endeavours to obtain even a sight of one were unavailing until the evening of the 27th, when one of them was brought to me by a boy, who said that he had killed it near Uyeasound: he stated that, seeing some people chasing it over the moors, he joined in the pursuit, and, being a swift runner, pressed it so closely that it turned and attacked him, upon which he threw two large stones, the second of which struck it upon the head and killed it; he then discovered that the wing had lately been broken, probably by a shot. Several men and boys have since told me that they saw the bird running over the moors, but were unable to overtake it. The following measurements were taken before skinning:—

| | | | | |
|---|---|---|---|---|
| Length, from middle claw to tip of bill | 4 | feet | 8½ | inches. |
| „ from tail to tip of bill | 3 | „ | 8½ | „ |
| Expanse of wings | 6 | „ | 8 | „ |
| Wing, from carpal joint to tip | 1 | „ | 9 | „ |
| Bill, from front to tip | 0 | „ | 4⅛ | „ |
| Tarsus | 0 | „ | 9¼ | „ |
| Middle toe and its claw | 0 | „ | 4¼ | „ |

*Sex*, male.

*Bill* light greenish horn-colour, slightly darker about the middle of both mandibles; base of upper, and a larger portion of base of under mandible brownish pink.

*Isis* brownish orange, darker towards the pupil.

*Feet* tarsi, and bare part of tibiæ black, tinged with olive-green; the under surface of the feet paler; claws black.

*Bare parts* about the forehead and eyes dull, pale crimson.

*The plumage* is very similar to that of the last specimen (Zool. 9767), but less clouded with brown. In this individual, also, large patches on the feathers beneath the wings are covered with the ova of parasites.

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I am unwilling to resume my monthly notes without apologising to my ornithological friends for having left many kind letters unanswered. Having mentioned to the Editor, in a private communication, the cause of my late temporary abandonment of my favourite pursuit, I can only trust that by inserting this he will signify his belief that, notwithstanding my long silence, my good wishes for the 'Zoologist' and its readers still continue unabated.

HENRY L. SAXBY.

Baltasound, Shetland, May 31st, 1869.

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*Marine Animals in Fresh Water.*—A somewhat personal discussion has recently taken place in the columns of the 'Athenæum' between Dr. Wallich and Col. Stuart Wortley respecting the possibility of cleaning the sheeting of foul ships by a temporary immersion in fresh water. The practicability of this proceeding is stoutly denied by Col. Wortley, whose views are ably supported by Mr. W. A. Lloyd, of the Hamburg Aquarium. In his last letter published in the 'Athenæum' of this week, Mr. Lloyd gives the following interesting details respecting the residence of marine animals in fresh water, and also regarding the residence of fresh-water animals in sea water:—"The abstract fact of certain marine animals being able to live occasionally or entirely in fresh water, is an interesting one, apart from its direct commercial bearings. We all know that the salmon, which breeds in rivers, goes into the sea to feed, and that the smelt, which is regarded as a sea fish, not only visits rivers during certain periods of the year for spawning purposes, but that it has been kept for years continuously in a fresh-water pond without ever going to sea, and that under these circumstances it has thriven well, has abundantly multiplied, and has not deteriorated for table purposes. So, too, the sturgeon, which lives in the sea, and at great depths, is found commonly in rivers of the Continent of Europe; and more than that, it has been kept for years in freshwater ponds in the Zoological Gardens of London and Hamburg. In the latter place it has *grown* amazingly as well, and with it there is now, in the same pond, a large sea lamprey (*Petromyzon marinus.*) This lamprey has been in the pond since 1865, and yet (on the authority of Mr. L. Lloyd, the excellent

Scandinavian naturalist) its near relative, the hag (*Myxine glutinosa*), is killed directly by fresh water. Plaice, flounders, and soles, all three of them marine fishes, are known to live permanently and to attain excellent condition in fresh water. The prawn (*Palæmon*), a well-known marine crustacean, has been repeatedly brought to me by hundreds and thousands, alive and well, in perfectly fresh water, and I have transferred them to their natural sea water in aquaria without any gradual preparation, and without doing them any harm. I have known the common shore crab (*Carcinus*) and the American horseshoe crab (*Limalus*), both marine, to run about a garden for days, moistened only by rain. Oysters may be seen daily in shops in London, alive and well, immersed in fresh water. Indeed, it is evident that a large number of marine animals and plants living between tide-marks, must be capable of enduring unharmed the heavy rain which frequently falls upon them uninterruptedly during the recess of the tide; and among such creatures, and so rained upon, few are more common than the sessile barnacle which infests ships' bottoms. I have found a marine alga (Ulva) growing in the River Thames at Greenwich, where the water is practically fresh, and yet another marine alga (*Griffithsia*) is instantly killed by being plunged in fresh water, its colour being at the same time discharged. Mr. L. Lloyd mentions three marine fish which in Sweden and Norway are also found in fresh water, namely, the cod, the whiting, and one species of Cottus. But, on the other hand, there certainly is a large number of marine animals which fresh water, or even weak sea water, does kill almost immediately, as Dr. Wallich says. For example there is a well-known passage in the late Professor Edward Forbes's "History of British Star-fishes," in which he relates how certain marine animals he was dredging for were paralysed in being drawn through a thin layer of surface fresh water floating on the sea-water below. But, among the marine animals on which fresh water is supposed to act as a certain poison, none have been so constantly quoted as sea anemones. The late Dr. George Johnston, in his 'History of British Zoophytes,' 2nd edit. 1847, p. 239, says, "These creatures, almost indestructible from mutilation and injury, may be killed in a few short minutes by immersion in fresh water." This work was the accepted authority on these animals for some years before the introduction of aquaria, but it is now almost useless, as far as sea anemones are concerned, and this almost universally accepted statement of Johnston's is certainly incorrect, for I have known specimens of Actinea Mesembryanthemum thrown away by mistake as dead, and afterwards be found brilliantly expanded in a puddle of rain-water in a London garden. Mr. Gosse has lately recorded a sea anemone living in India, in one of the mouths of the Ganges, where the saltness of the water is only about ten parts in a thousand, instead of thirty-five parts, as on the coast of Britain. These animals are also found in the Baltic Sea, where the density is only about fifteen in a thousand. The Fauna of the Baltic is a singularly mixed one. Thus among a large number of truly marine animals (some in no way differing in size from those in the neighbouring North Sea, but others much dwarfed), may be seen swimming the common fresh-water perch, and two species of the common fresh-water stickleback, and of these two, the perch will live if transferred to quite fresh water, and will die if put into quite sea water; while the two sticklebacks will live quite well if removed from the Baltic water and be placed in either fresh water or fully dense North Sea water. But there is a deep purple variety of the common North Sea star-fish (*Uraster rubens*) living in the Baltic which is killed directly on being placed in North Sea water; and by no gradual process of acclimatisation have I ever succeeded in getting it to live in the denser fluid. Whelks and some other mollusks from the Baltic Sea are also killed by North Sea water, but not so constantly as the echinoderm I have named; while I have never found any marine fish in the Baltic which will not live in North Sea water in aquaria. The recorded instances in which truly fresh-water animals have permanently lived in sea water are less numerous than those in which marine creatures have been known to live in fresh water. I have already named two sticklebacks, and I have to add that the common fresh-water eel does very well in marine aquaria in Hamburg. One very curious example occurs to me; there is a byssus-making fresh-water bivalve (*Dreissinia polymorpha*) found abundantly around London, and sometimes choking up London water-pipes. This shell is stated to have been introduced from Asia Minor about fifty years ago, attached by its threads to the bottoms of ships: and in this manner it must have been dragged unharmed through thousands of miles of sea water."

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*Zoology of the Swedish Arctic Exploration.*—Arctic explorations have been conducted with much energy and success by other nations than our own. Four expeditions have been carried on by Swedes, and an account of the fourth of these was presented to the Royal Geographical Society at its last meeting, in a paper written by A. P. Nordenskiöld. The expedition had chiefly scientific objects, and it was at first intended that some of its members should winter on Seven Islands to the north of Spitzbergen. The ship, the Sofia, was fitted out at Carlscrona, and touched at Gottenburg, to take in the scientific members of the expedition. The Sofia started in the beginning of July, 1868, and on the 6th of that month landed at Bear Island. This island has a desolute plateau from 50 ft. to 100 ft. in height. Its two chief hills are called Mount Misery and Vogelberg. Numerous birds are found on the island. The cliffs are precipitous, and there are many small lakes on the plateau. Heaps of stones, suggestive of moraines, are found; but the members of the expedition satisfied themselves that these stone heaps are produced by the action of frost and water, and not by the effect of glaciers. A few cryptogams were the only vegetables found. The birds of the island are already well known; the chief additions to knowledge that were made by this visit were with regard to Marine Flora and Zoology. Several Brachiopoda were brought from Bear Island. Coal, of an age not determined, was found; and also Calamites, Lepidodendra, &c. On the 27th of July the expedition left Bear Island, and went towards the south of Spitzbergen. Ice was met at South Cape; and the Sofia had to go to the west of Spitzbergen. In 1868 the whole of the east of Spitzbergen was inaccessible on account of ice. The Sofia anchored in Ice-fiord, and interesting facts were ascertained with regard to the geology of the fiord, which was already known, but not very fully. Norwegian vessels go to Spitzbergen to find the walrus, and also to hunt the reindeer. Between two thousand and three thousand head of reindeer are annually killed in Spitzbergen: for their maintenance there must be a considerable extent of meadow land, and the fact that such great numbers are killed suggests a possibility of their immigration from Nova Zembla; but the great distance of the latter place from Spitzbergen renders this highly improbable. The water of the Ice-fiord is clear and beatiful in summer, and the fields on the shore are covered with poppies and saxifrages. On the 13th of August the Sofia left Ice-fiord, and went northward, looking for coal in King's Bay, where it was not obtained, and then going to Amsterdam

Island, where a coal depot had been established. It was then determined to try whether the east coast of Greenland could not be reached; but the ice utterly prevented the effecting of that purpose. At this time lat 81° 16′ N. was reached. Soundings were made both north and south of Spitzbergen, which resulted in the important discovery that that island is a mere continuation of the Scandinavian peninsula, the water to the south of Spitzbergen never having a greater depth than three hundred fathoms, while north of it the ocean is two thousand fathoms deep. From this depth clay was brought up containing not only microscopic animals, but also Crustacea. From a depth of two thousand six hundred fathoms very small Foraminiferæ, white and red, were brought up. Drift wood was discovered in lat. 80° 40′ N., and hollow glass balls, which are used as floats by the Loffoden fishermen. These prove the continuation of the Gulf Stream to the northward. In the beginning of September, Gilles Land and Amsterdam Island were visited, and a number of the collections forwarded to Stockholm, to be deposited there and in Gottenburg, in the museums. Sept. 16 found the Sofia again trying for the Seven Islands; but the ice prevented the journey. However, in 17½ E. long. (Greenwich), lat. 81° 42′ N. was reached, point which the people on board the Sofia considered to be the farthest north ever reached. The ice, which prevented any further progress to the north, contained stones, and was black with gravel, indicating that it came from land, and giving the idea that there might be land far to the north. The coal depot was again returned to, and the coal had to be dug out from under the snow. Once more, notwithstanding the lateness of the year, the Sofia tried to proceed farther north, and again reached 81° N. Here the ship was driven on a berg, and a leak sprung, which was of so dangerous a character that, when the Sofia arrived back at Amsterdam Island, the water was two feet deep in the cabin. After this accident, farther polar exploration was impossible. One of the chief objects of the Swedish expedition was to ascertain whether in the autumn it might not be possible to reach a point farther north than any that has yet been attained, and so to contribute to the solution of the question as to the possibility of an open polar sea. The officers of the expedition concluded that it would not be possible, even under the most favourable circumstances, ever to reach farther north than 83° N., even if that could ever be reached by the Spitzbergen route; and they consider that the best chance of reaching the North Pole will be by sledge expeditions starting from Smith's Sound or some similar place.

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*Flight of Butterflies, Moths, &c.*—First as to the height to which they ascend. "Benares, June 17, 1863.—This morning, whilst sitting in the verandah of Mr. Smith, P.S.A., I observed a large moth, Anisoneura hypocyana, fly into the place and settle inside on the sloping roof: I at once sent for my insect net, and placed it over him; but, from the unevenness of the bamboos, he escaped me and flew out of the verandah. Again he sought shelter under cover, and my man struck at him with the net; he only hit the body of the moth with the bamboo ring, and alarming him very much, caused him to fly out of the verandah and steadily upwards in the air,—"towering," as it is called, with birds. The sky was of the clearest blue, with a few light white clouds, and four of us were watching him. A swallow, H. Davurica, made a dash at him, but without the slightest effect: higher and higher, he went, until we lost sight of him; although, owing to the background of white cloud, we could see him for a very long time. When he got very high, a large black swift (*Cypselus affinis*) contended with him, but could not seize him, for we saw the bird leave him and he still ascending. My native servant remarked, on seeing this—'See! he has gone so high that the bird cannot get up there, but has had to come down again.' The ease with which he rose to this great height and the rapidity of the ascent were astounding. In reading the above, it should be borne in mind that this moth measures 4½ inches across its expanded wings, has a very stout body, and is of great strength, so that neither swift nor swallow could take it in its gape. I remarked that it was attacked three times by a Cœlyoxis apicata whilst sitting in the verandah, but for what reason I cannot say."

Now, as to speed and endurance of flight of butterflies and other insects. "Pera steamer, Oct. 12, 1860.—About twelve miles east of Cape Bon, Africa, when sitting in the after part of the vessel, I observed a 'painted lady' butterfly. It appeared to come from seaward, and readily overtook the steamer, which was then making 10½ knots an hour. I observed the insect for about twenty-five minutes, during which time it made three distinct flights from the ship, and each time *appeared* to alight on the waves: the wind was nearly ahead, and the log was heaved at the time, whereby the rate of speed was settled. The insect often soared high, and did not seem at all fatigued.

"Oct. 29th.—Six hundred miles from Aden a butterfly flew on board, probably from Socotova.

"Oct. 30th.—A dragon-fly came to hand, 800 miles from the nearest land: two swifts and a swallow also came on board.

"Nov. 4.—A small finch; also a dragon-fly darting about, and keeping with ease with the vessel; a dark brown butterfly, like a leaf-butterfly, easily keeping up; a pigeon and two hawks also came. This last butterfly kept up bravely, although the wind was against us—say, at least three or four knots an hour, whilst we were steaming at from nine to ten knots."

I have often noted butterflies keeping up with an Indian railway train, going at the rate of about twenty-eight miles an hour, with the greatest ease, for a considerable time; as also moths. In the case of the former they were at some distance from the train, but the latter were generally close, so that they (the moths) may have been influenced by the current of air, and so carried onward. I am well aware that some butterflies travel fifty or sixty miles an hour for short distances, and I trust that these few notes may elicit others from some of your correspondents, many of whom, I doubt not, are reading with interest the curious experiments occasionally recorded in 'Scientific Opinion,' which are now being made to ascertain the rapidity with which the vibrations of the wings of insects occur.—*C. Horne; Upper Norwood, June* 4, 1869.

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*Rare Bats at Torquay.*—Two uncommon bats were killed near Torquay in May, viz., the great bat (*Noctulinia altivolans*) and the barbastelle (*Barbastellus communis*). The former measured in expanse of wing 13½ inches: both these bats were females. Last year (I forget the month), in the same neighbourhood, a number of the great horse-shoe bat (*Rhinolophus Ferrum-equinum*) were found in a cellar which was tolerably often resorted to.—*A. de Hugel; Florian, Torquay, June* 6, 1869.

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## THE BOAT ACCIDENT IN SHETLAND.

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